

CLAIMS

What is claimed is:

1. A door sensor characterized in that it is equipped with
at least one door position detecting means which is attached to at least one door body
that can be opened and/or closed and which is capable of detecting at least one position
occupied by the at least one door body during opening and/or closing thereof;
at least one object detecting means which is attached to the at least one door body and
which detects presence and/or absence of at least one object in at least one detectable
zone; and
at least one object determining means which receives at least one output from the at
least one door position detecting means and the at least one object detecting means, and
which determines, in correspondence to at least one position occupied by the at least one
door body during opening and/or closing thereof, whether at least one object detected by
the at least one object detecting means is at least one object intended for detection.
2. A door sensor according to claim 1, the door sensor being characterized in that
the at least one door position detecting means is attached to at least one door body
made capable of being opened and/or closed as a result of rotational motion and is
constituted so as to be capable of detecting at least one angular displacement position of
the at least one door body.
3. A door sensor according to claim 2, the door sensor being characterized in that
the at least one door position detecting means is made up of at least one sensor which
employs geomagnetism to detect the at least one angular displacement position of the at
least one door body and/or at least one sensor which employs at least one gyroscope to
detect the at least one angular displacement position of the at least one door body.
4. A door sensor according to claim 1, 2, or 3, the door sensor being characterized in that
it is further equipped with
at least one door controller that is attached to at least one surface facing toward at
least one direction toward which the at least one door body moves when it is being
opened and that stops, slows, and/or reverses the process of opening the door body in the

6 event that at least one object detected by the at least one object detecting means is at least
7 one object intended for detection.

1 5. A door sensor according to claim 1, 2, or 3, the door sensor being characterized in that
2 it is further equipped with

3 at least one door controller that is attached to at least one surface facing toward at
4 least one direction toward which the at least one door body moves when it is being
5 closed and that stops, slows, and/or reverses the process of closing the door body in the
6 event that at least one object detected by the at least one object detecting means is at least
7 one object intended for detection.

1 6. A door sensor according to claim 4, the door sensor being characterized in that it is
2 further equipped with

3 at least one door controller that is attached to at least one surface facing toward at
4 least one direction toward which the at least one door body moves when it is being
5 closed and that stops, slows, and/or reverses the process of closing the door body in the
6 event that at least one object detected by the at least one object detecting means is at least
7 one object intended for detection.

1 7. A door sensor according to claim 1, 2, 3, or 6, the door sensor being characterized in
2 that

3 the at least one door position detecting means, the at least one object detecting means,
4 and the at least one object determining means are housed within one sensor package.

1 8. A door sensor according to claim 4, the door sensor being characterized in that

2 the at least one door position detecting means, the at least one object detecting means,
3 and the at least one object determining means are housed within one sensor package.

1 9. A door sensor according to claim 5, the door sensor being characterized in that

2 the at least one door position detecting means, the at least one object detecting means,
3 and the at least one object determining means are housed within one sensor package.

1 10. A door sensor according to claim 1, 2, 3, 6, 8, or 9, the door sensor being
2 characterized in that it is further equipped with

3 at least one fixed object detecting means which is attached to at least one fixed object
4 installed at at least one arbitrary location and which detects presence and/or absence of at

5 least one object within at least one detectable zone, the at least one detectable zone being
6 at least one previously established fixed location.

1 11. A door sensor according to claim 4, the door sensor being characterized in that it is
2 further equipped with

3 at least one fixed object detecting means which is attached to at least one fixed object
4 installed at at least one arbitrary location and which detects presence and/or absence of at
5 least one object within at least one detectable zone, the at least one detectable zone being
6 at least one previously established fixed location.

1 12. A door sensor according to claim 5, the door sensor being characterized in that it is
2 further equipped with

3 at least one fixed object detecting means which is attached to at least one fixed object
4 installed at at least one arbitrary location and which detects presence and/or absence of at
5 least one object within at least one detectable zone, the at least one detectable zone being
6 at least one previously established fixed location.

1 13. A door sensor according to claim 7, the door sensor being characterized in that it is
2 further equipped with

3 at least one fixed object detecting means which is attached to at least one fixed object
4 installed at at least one arbitrary location and which detects presence and/or absence of at
5 least one object within at least one detectable zone, the at least one detectable zone being
6 at least one previously established fixed location.

1 14. A door sensor according to claim 1, 2, 3, 6, 11, or 12, the door sensor being
2 characterized in that

3 at least one position information output from one of the at least one door position
4 detecting means is used in shared fashion with a plurality of object detection outputs
5 from a plurality of the at least one object detecting means.

1 15. A door sensor according to claim 4, the door sensor being characterized in that
2 at least one position information output from one of the at least one door position
3 detecting means is used in shared fashion with a plurality of object detection outputs
4 from a plurality of the at least one object detecting means.

1 16. A door sensor according to claim 5, the door sensor being characterized in that
2 at least one position information output from one of the at least one door position

3 detecting means is used in shared fashion with a plurality of object detection outputs
4 from a plurality of the at least one object detecting means.

1 17. A door sensor according to claim 10, the door sensor being characterized in that
2 at least one position information output from one of the at least one door position
3 detecting means is used in shared fashion with a plurality of object detection outputs
4 from a plurality of the at least one object detecting means.

1 18. A door sensor according to claim 1, 2, 3, 6, 8, 9, 11, 12, 13, 15, 16, or 17
2 characterized in that

3 whereas the at least one object detecting means is constituted so as to permit
4 switching between or among detectable zones;

5 the door sensor is further equipped with at least one zone switching means which
6 receives at least one output from the at least one door position detecting means and
7 which switches between or among detectable zones of the at least one object detecting
8 means in correspondence to at least one position occupied by the at least one door body
9 during opening and/or closing thereof.

1 19. A door sensor according to claim 4 characterized in that

2 whereas the at least one object detecting means is constituted so as to permit
3 switching between or among detectable zones;

4 the door sensor is further equipped with at least one zone switching means which
5 receives at least one output from the at least one door position detecting means and
6 which switches between or among detectable zones of the at least one object detecting
7 means in correspondence to at least one position occupied by the at least one door body
8 during opening and/or closing thereof.

1 20. A door sensor according to claim 5 characterized in that

2 whereas the at least one object detecting means is constituted so as to permit
3 switching between or among detectable zones;

4 the door sensor is further equipped with at least one zone switching means which
5 receives at least one output from the at least one door position detecting means and
6 which switches between or among detectable zones of the at least one object detecting
7 means in correspondence to at least one position occupied by the at least one door body
8 during opening and/or closing thereof.

1 21. A door sensor according to claim 7 characterized in that

2 whereas the at least one object detecting means is constituted so as to permit
3 switching between or among detectable zones;

4 the door sensor is further equipped with at least one zone switching means which
5 receives at least one output from the at least one door position detecting means and
6 which switches between or among detectable zones of the at least one object detecting
7 means in correspondence to at least one position occupied by the at least one door body
8 during opening and/or closing thereof.

1 22. A door sensor according to claim 10 characterized in that

2 whereas the at least one object detecting means is constituted so as to permit
3 switching between or among detectable zones;

4 the door sensor is further equipped with at least one zone switching means which
5 receives at least one output from the at least one door position detecting means and
6 which switches between or among detectable zones of the at least one object detecting
7 means in correspondence to at least one position occupied by the at least one door body
8 during opening and/or closing thereof.

1 23. A door sensor according to claim 14 characterized in that

2 whereas the at least one object detecting means is constituted so as to permit
3 switching between or among detectable zones;

4 the door sensor is further equipped with at least one zone switching means which
5 receives at least one output from the at least one door position detecting means and
6 which switches between or among detectable zones of the at least one object detecting
7 means in correspondence to at least one position occupied by the at least one door body
8 during opening and/or closing thereof.

1 24. A door characterized in that the at least one door sensor according to any one of

2 claims 1 through 23 is attached to at least one door body, the door body engaging in
3 opening and/or closing operations in linked fashion with object detecting operations of
4 the at least one door sensor.